

Claims

- [c1] 1. Method for manufacturing an outlet nozzle (10) for use in a liquid fuel rocket engine, said method comprising:
- providing nozzle forming a body of revolution having an axis of revolution and a cross section that varies in diameter along said axis, said nozzle having a wall structure comprising a plurality of mutually adjacent cooling channels (11) that extend, substantially in parallel with one another, from an inlet end (12) to an outlet end (13) of the nozzle;
 - providing a plurality of preprocessed profile members (14, 14'), each having a web (15) and flanges (16) protruding from said web;
 - milling each profile member (14) to present a longitudinally gradually tapering width;
 - configuring at least said profile members (14') , at least at a first end portion (17) thereof, with two flanges (16) on one side of the web (15) and one flange (16) on the opposite side of said web, said profile member (14') having an h-shape at said first end portion (17);
 - curving said member (14) to conform with the wall section of the nozzle; and

joining the members by welding the flanges (16) to form a bell-shaped nozzle structure with cooling channels (11) formed by adjacent webs (15) and adjacent pairs of flanges (16).

- [c2] 2. The method as recited in claim 1, further comprising: configuring said flanges (16) to protrude in opposite directions from said web (15).
- [c3] 3. The method as recited in claim 1, further comprising: milling said profile member (14') in such a way that said single flange on the opposite side of the web is at least substantially eliminated at a second end portion (18) of the profile member, so that the profile member at said second end portion forms a C-shape in cross section.
- [c4] 4. The method as recited in claim 1, further comprising: providing each profile member (14) with two flanges (16) on each side of the web (15).
- [c5] 5. The method as recited in claim 1, further comprising: forming the profile members (14,14') by extrusion.
- [c6] 6. The method as recited in claim 5, further comprising: extruding said profile members (14,14') from aluminum.
- [c7] 7. The method as recited in claim 6, further comprising: extruding said profile members (14,14') from copper.

- [c8] 8. The method as recited in claim 7, further comprising:
extruding said profile members (14,14') with rounded
transitions between the web (15) and the flanges (16).
- [c9] 9. The method as recited in claim 1, further comprising:
forming said profile members (14,14') from sheet metal
plate.
- [c10] 10. The method as recited in claim 9, further comprising:
selecting said sheet metal plate to comprise stainless
steel and nickel base material.
- [c11] 11. The method as recited in claim 1, further comprising:
milling said flanges (16) so that a channel cross sectional
area is larger at the outlet nozzle end (13) than at the in-
let nozzle end (12).
- [c12] 12. The method as recited in claim 1, further comprising:
milling the web (15) to present a longitudinally gradually
tapering width.
- [c13] 13. The method as recited in claim 1, further comprising:
performing the welding processes by means of fusion
welding.
- [c14] 14. The method as recited in claim 1, further comprising:
welding the profile members (14) to present a rotational
symmetric outer nozzle surface.

